

## Correlations of Somatometric Parameters Bodies and Indices of Physical Development of Students Sumy Region

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In the article results of the correlation analysis are provided, they indicate direct correlation between body mass, body height and anthropometric indices of physical development. Strong statistic correlation is observed in basic group, weak- in groups of special medical and physical rehabilitation.

**Keywords:** Students, physical development, anthropometry, somatometry, dynamometry, vital capacity.

**Introduction** Problem of student youth health is currently important. Every year 30% of applicants to higher educational institutions go to special medical groups. Solution of this disharmonic physical development of students is seen in physical education with purpose of increasing and improving physical activity of students. [6,2]

In scientific studies the method of correlation analysis is applied that allows to establish the degree of correlations between the studied parameters. [5]

**Object and methods of research.** Object of the research is 48 female students Sumy State University.

The first group consisted of 16 students of basic group (18-23 years old). The second group consisted of 16 students of special medical group (18-23 years old). The third group consisted of 16 students of physical rehabilitation group (18-23 years old).

Anthropometry was made according to Bunak V.V. methods [1] applying some modifications of Shaparenko P.P. [4]

Statistical analysis of the results was carried out by standard methods of variational statistics using the program Excel. [3] Close correlations between studied parameters were indicated by following scale Zatsiorsky, V.M. Sport Metrology, 1982 [7]:  $r=0,09-0,19$  - shows very weak correlation; with  $r=0,2-0,49$  – weak correlation;  $r=0,5-0,69$  – correlation is considered to be medium;  $r=0,7-0,99$  – strong.

The purpose of the study is to find correlations between body mass, body height and anthropometric indices in various groups of physical development of Sumy State University students.

### Results of research and their discussion

In the process of studying correlations between body weight and anthropometric indices it was determined strong statistic correlation in the first group - with body length ( $r=0,713$ ), with transverse mesothoracic diameter ( $r=0,805$ ), with antero-posterior mesothoracic diameter ( $r=0,715$ ), with transverse diameter of the shoulder distal epiphysis ( $r=0,787$ ), with transverse diameter of the forearm ( $r=0,822$ ), with trochanteric diameter ( $r=0,703$ ), with circumference of the chest ( $r=0,706$ ), in the second group - with transverse diameter of the shoulder distal epiphysis ( $r=0,792$ ), with trochanteric diameter ( $r=0,746$ ), with circumference of the chest ( $r=0,822$ ), in the third group - with transverse mesothoracic diameter ( $r=0,703$ ), with breadth of pelvis ( $r=0,791$ ), with transverse diameter of the hip distal epiphysis ( $r=0,741$ ), with circumference of the chest ( $r=0,858$ ).

Medium statistic correlation is determined in the first group between body weight and such parameters – with length of head ( $r=0,52$ ), with breadth of face ( $r=0,627$ ), with breadth of shoulders ( $r=0,665$ ), with breadth of wrist ( $r=0,638$ ), with breadth of pelvis ( $r=0,651$ ), with breadth of foot ( $r=0,459$ ); in the second group – with mesothoracic diameter ( $r=0,558$ ), with antero-posterior mesothoracic diameter ( $r=0,686$ ), with transverse diameter of forearm ( $r=0,575$ ), with breadth of wrist ( $r=0,539$ ), with transverse diameter of the shin distal epiphysis ( $r=0,650$ ); in the third group- with transverse diameter of forearm ( $r=0,505$ ), breadth of wrist ( $r=0,621$ ), with trochanteric diameter ( $r=0,699$ ), with transverse diameter of the shin distal epiphysis ( $r=0,571$ ); with transverse diameter of the shoulder distal epiphysis ( $r=0,579$ ).

It must be noted that with weak statistic correlation body weight corrects dynamometry of the left hand ( $r=0,352$ ), transverse diameter of the hip distal epiphysis ( $r=0,756$ ), transverse diameter of the shin distal epiphysis ( $r=0,413$ ) in the first group; in the second group – vital capacity ( $r=0,413$ ), breadth of low jaw ( $r=0,248$ ), breadth of shoulders ( $r=0,370$ ), breadth of pelvis ( $r=0,443$ ), transverse diameter of the hip distal epiphysis ( $r=0,262$ ), breadth of foot ( $r=0,459$ ), dynamometry of the right ( $r=0,494$ ), and left hand ( $r=0,312$ ); in the third group- breadth of head ( $r=0,229$ ), breadth of face ( $r=0,261$ ), with breadth of shoulders ( $r=0,389$ ), dynamometry of the right hand ( $r=0,259$ ).

With very weak statistic correlation body weight also corrects in the first group breadth of head ( $r=0,148$ ), breads of low jaw ( $r=0,155$ ), dynamometry of the right hand ( $r=0,185$ ), vital capacity ( $r=0,09$ ); in the second group- body length ( $r=0,19$ ), length of the head ( $r=0,136$ ), breadth of head ( $r=0,14$ ), breadth of face ( $r=0,166$ ); in the third group- length of the head ( $r=0,096$ ), breadth of foot ( $r=0,171$ ), dynamometry of the left hand ( $r=0,152$ ).

In the process of studying correlation between body height and anthropometric indices it was determined strong statistic correlation in the first group - with trochanteric diameter ( $r=0,7208$ ), in the second and third groups- there was no strong correlation.

Medium statistic correlation is observed in the first group with vital capacity ( $r=0,5882$ ), length of the head ( $r=0,69$ ), transverse mesothoracic diameter ( $r=0,6955$ ), transverse diameter of forearm ( $r=0,637$ ), transverse diameter of the hip distal epiphysis ( $r=0,621$ ); in the second group- with breadth of shoulders ( $r=0,664$ ), in the third group- with dynamometry of the left hand ( $r=0,595$ ).

Weak statistic correlation is observed in the first group with breadth of face ( $r=0,33$ ), with breadth of shoulders ( $r=0,309$ ), antero-posterior mesothoracic diameter ( $r=0,336$ ), transverse diameter of the shoulder distal epiphysis ( $r=0,223$ ), breadth of pelvis ( $r=0,428$ ), transverse diameter of the shin distal epiphysis ( $r=0,301$ ), breadth of foot ( $r=0,491$ ), circumference of the chest ( $r=0,247$ ), in the second group – vital capacity ( $r=0,344$ ), length of the head ( $r=0,3$ ), breadth of low jaw ( $r=0,0321$ ), transverse mesothoracic diameter ( $r=0,304$ ), antero-posterior mesothoracic diameter ( $r=0,2557$ ), transverse diameter of the shoulder distal epiphysis ( $r=0,218$ ), transverse diameter of forearm ( $r=0,3291$ ), breadth of pelvis ( $r=0,444$ ), trochanteric diameter ( $r=0,2661$ ), transverse diameter of the hip distal epiphysis ( $r=0,2621$ ), transverse diameter of the shin distal epiphysis ( $r=0,1418$ ), breadth of foot ( $r=0,1323$ ), dynamometry of the left hand ( $r=0,1323$ ), circumference of the chest ( $r=0,2494$ ), in the third group – vital capacity ( $r=0,318$ ), length of the head ( $r=0,207$ ), breadth of head ( $r=0,317$ ), breadth of face ( $r=0,2881$ ), transverse diameter of the shoulder distal epiphysis ( $r=0,1822$ ), breadth of wrist ( $r=0,20$ ), breadth of pelvis ( $r=0,21$ ), transverse diameter of the shin distal epiphysis ( $r=0,3815$ ), dynamometry of the right hand ( $r=0,595$ ).

Very weak statistic correlation is observed in the first group with breadth of head ( $r=0,156$ ), dynamometry of the right hand ( $r=0,163$ ), in the second group with breadth of face ( $r=0,13$ ), breadth of wrist ( $r=0,127$ ), in the third group – with transverse diameter of forearm ( $r=0,162$ ), trochanteric diameter ( $r=0,1003$ ), transverse diameter of the hip distal epiphysis ( $r=0,092$ ), breadth of foot ( $r=0,181$ ), circumference of the chest ( $r=0,125$ ).

There was no correlation between height and breadth of low jaw ( $r=0,076$ ), in the second group - breadth of head ( $r=0,1$ ), dynamometry of the right hand ( $r=0,084$ ), in the third group – breadth of

low jaw ( $r=0,034$ ), transverse mesothoracic diameter ( $r=0,065$ ), antero-posterior mesothoracic diameter ( $r=0,058$ ) (Table 1).

Table 1

Correlation Indexes of Weight and Height with Somatometric Parameters of Students' Bodies

Somatic characteristic	Weight			Height		
	1	2	3	1	2	3
Length of body	0,713	0,19	0,284	0,7137	0,19	0,284
Vital capacity	0,087	0,413	0,254	0,5888	0,3448	0,318
Length of head	0,52	0,136	0,096	0,69	0,3	0,207
Breadth of head	-0,148	0,14	0,226	-0,156	-0,1	0,317
Breadth of face	0,627	0,166	0,261	0,3384	-0,13	0,2881
Breadth of low jaw	-0,155	0,246	0,034	-0,076	-0,3214	0,0345
Breadth of shoulders	0,665	0,370	0,389	0,3039	0,66459	0,5852
Transverse mesothoracic diameter	0,805	0,558	0,703	0,6955	0,30450	- 0,0651
Antero-posterior mesothoracic diameter	0,715	0,686	0,693	0,3366	-0,2557	- 0,0582
Transverse diameter of the shoulder distal epiphysis	0,787	0,792	0,579	0,2234	0,21886	- 0,1828
Transverse diameter of forearm	0,822	0,575	0,505	0,6379	0,32918	0,1627
Breadth of wrist	0,638	0,539	0,621	0,4538	0,12737	0,2059
Breadth of pelvis	0,651	0,443	0,791	0,4282	0,44496	0,2177
Trochanteric diameter	0,703	0,746	0,699	0,7208	0,26614	0,1003
Transverse diameter of the hip distal epiphysis	0,456	0,262	0,741	0,6218	0,26219	0,0926
Transverse diameter of the shin distal epiphysis	0,4130	0,650	0,571	0,3016	0,14185	0,3815
Breadth of foot	0,632	0,459	0,171	0,4919	0,13235	0,1819
Dynamometry of the right hand	0,185	0,494	0,259	-0,163	0,0842	0,2739
Dynamometry of the left hand	0,352	0,312	0,152	0,0044	0,13232	0,5954
Circumference of the chest	0,706	0,8223	0,85833	0,2475	-0,2494	0,1252

Results of correlation analysis indicate direct correlation between body mass and body height and organization of body, physical development of Sumy State University students.

In the result of the research in 3 groups following conclusions were made: strong statistic correlation is observed in basic group, weak and very weak correlation- in special medical group and group of physical rehabilitation. Negative coefficients of correlation can be explained by stability of these sizes with increasing of circumference and transverse sizes.

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